TITLE: THE CONCEPTS OF FLAVOR IN THE CIGARETTE INDUSTRY

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ABSTRACT: Tobacco is defined in terms of seed, plant, cured leaf and various products--with more emphasis on smoking products in general and cigarettes in particular. The role of genetic factors, environment, cultural/management practices, harvesting/curing and aging/fermentation on the chemical and physical make-up of the leaf are discussed. Besides chemistry per se, other factors such as filling power, moisture holding capacity and burning qualities contribute to the basic characteristics of the cured leaf. Since the actual product consumed is the smoke, the complex parameters involved in the smoke formation will be covered. This will include both tobacco and non-tobacco parameters (additives, paper permeability, filter efficiency, etc.) which alter the physical and chemical composition of the smoke. The concept of the cigarette model, in terms of physical and chemical characteristics of the mainstream smoke, will be reviewed. The smoke-smoker relationship will be discussed in terms of both flavor detection--taste, smell and touch--and the physiological/psychological effect of nicotine and related alkaloids. The important role of flavor in the evaluation of smoking products will be discussed and emphasized in the development of low "tar" and nicotine cigarettes with acceptable smoking qualities. The chemical constituents of the mainstream smoke--especially the total particulate matter (TPM)--and the selective contribution of these constituents to smoke flavor will be reviewed. Today's achievements in the fields of smoke analysis and flavor precursors are aimed not only towards understanding smoke formation but mainly towards being able to modify and improve the flavor qualities of the smoke.

REVIEW: The majority of this paper dealt with general knowledge of the cigarette indus-try: factors governing leaf quality, formation of mainstream smoke during smoking and the basic constituents - gas phase and particulate smoke. Smoke flavor can be attributed to a whole assembly of complex mixtures. However, the author noted that chemical analyses of tobacco and smoke cannot establish a correlation between components and flavor. He stated that two percent of the nicotine in a cigarette is absorbed, if the smoker inhales every puff and the filter is 50% efficient. The more acidic the smoke, the less nicotine is absorbed. The author described a 1973 North Carolina State University study to determine the Just Noticeable Difference (JND) for compounds in cigarette smoke. For a cigarette with 15.8% sugar, the JND was 11 mg. The JND for nicotine was 3.60 mg/gram for a cigarette with 2.4% nicotine. By comparing acceptability (in terms of market share) with tar delivery, it was deducted that the psychophysi-cal effect of nicotine does not play a major role in acceptability. Also, acceptability of 20 cigarettes delivering 15 mg tar varied from large to small, based on market share, and several brands with lower tar delivery were selling more than some of the high tar brands. The author concluded that less tar may give more flavor impact. Also, he observed that a 10 mg cigarette may be less harmful than an 8 mg tar cigarette due to possible difference in the harmful components of both "tars". The author's use of market share as a rating of acceptability is questionable, due to many other factors controlling market share.

-Reviewed by R. Mitchell

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